

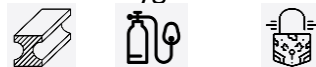
Keywords

Ion	The charged particle formed when an atom gains or loses electrons
Displacement Reaction	When a more reactive substance takes the place of a less reactive substance
Oxidation	The gaining of oxygen or the loss of electrons (OIL)
Reduction	The loss of oxygen or the gain of electrons (RIG)
Base	Ionic compounds that can neutralise acids
Alkali	Soluble bases
Acid	A substance that reacts with a base. Has a pH value less than 7.
Neutral	A solution with a pH of 7, which is neither acidic nor alkaline.
Neutralisation	The chemical reaction of an acid and a base in which a salt and water are formed. If the base is a carbonate, carbon dioxide is also produced.
pH	A number between 0-14 which shows how strongly acidic or alkaline a solution is.
Indicators	Substances used to identify whether unknown solutions are acidic or alkaline.

C5 Chemical Changes

1. General Word Equations

Metal + oxygen → Metal oxide



Metal + water → Metal hydroxide + hydrogen



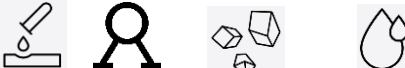
Metal + acid → Salt + hydrogen



Acid + base → Salt + water



Acid + alkali → Salt + water

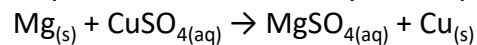


Acid + carbonate → Salt + water + carbon dioxide

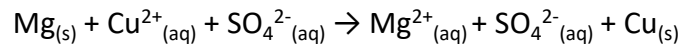


2. Ionic and Half Equations (Higher)

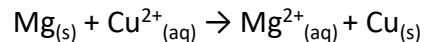
Step 1: Write a balanced symbol equation:



Step 2: Separate the ions:



Step 3: Delete the species that appear exactly the same on both sides:



Step 4: Write the half equations:



State symbols:

(s) = solid, (l) = liquid, (g) = gas, (aq) = aqueous

C5 Chemical Changes

3. Displacement reactions

	Magnesium sulphate	Zinc sulphate	Iron sulphate	Copper sulphate
Magnesium		✓	✓	✓
Zinc	✗		✓	✓
Iron	✗	✗		✓
Copper	✗	✗	✗	

4. Extracting Metals

Least reactive metals occur native. More reactive metals occur as ores.

For ores containing metals less reactive than carbon, carbon can be used to reduce the metal in a displacement reaction.

Example:

Iron oxide + carbon → Iron + carbon dioxide

Some less reactive metals can be reduced using hydrogen:

Copper oxide + hydrogen → copper + water

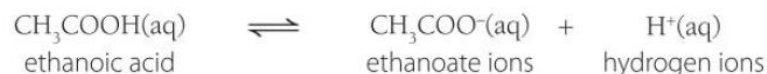
5. Strong and weak acids (Higher)

When an acid dissolves in water it dissociates in to its ions. Strong acid fully dissociate in to the ions. Weak acid partially dissociate in to their ions.

For example; hydrochloric acid (strong acid)



Ethanoic acid (weak acid)



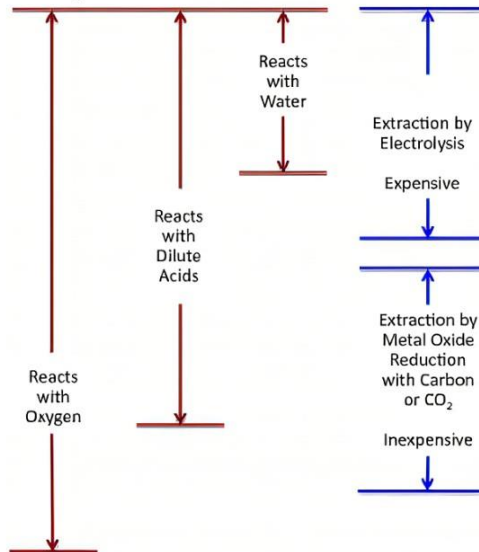
Metals Activity Series

Very Reactive

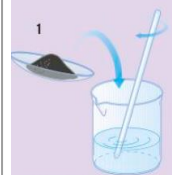


Very Unreactive

Li	Lithium
K	Potassium
Ba	Barium
Ca	Calcium
Na	Sodium
Mg	Magnesium
Al	Aluminum
C	Carbon
Zn	Zinc
Fe	Iron
Ni	Nickel
Sn	Tin
Pb	Lead
H	Hydrogen
Cu	Copper
Hg	Mercury
Ag	Silver
Au	Gold
Pt	Platinum



6. Making a salt (required practical)



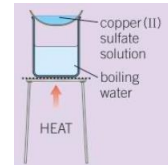
1 Add copper oxide to warm sulphuric acid and stir.



Solution will go blue.



Filter solution to remove excess copper oxide



Heat solution over water bath to remove water and form dry crystals